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ABSTRACT

Designed to help university and college faculty, academic administrators, and testing personnel select appropriate tests for college admission, this booklet provides a comparative description of the three biology examinations offered by the College Board. In separate sections, the following topics are covered: faculty improvement in test development; preparation for and uses of the Admissions Testing Program (ATP) Achievement Test in Biology, the Advanced Placement (AP) Program test, and the College Level Examination Program (CLEP) test; content specifications; cognitive abilities tested; differences among the examinations; and AP candidate and college student performance on the tests. Charts of test data and a glossary are included. (LP)

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THE BIOLOGY EXAMINATIONS OF THE COLLEGE BOARD. 1980-1982

1980

College Entrance Examination Board
New York, New York

and

Educational Testing Service
Princeton, New Jersey

SE 011 783

The Biology Examinations of the College Board 1980-82

The College Board offers three examinations in biology:

- Admissions Testing Program (ATP) Achievement Test in Biology
- Advanced Placement (AP) Program Examination in Biology
- College-Level Examination Program (CLEP) Subject Examination in General Biology

All three examinations help postsecondary institutions respond to the diverse backgrounds of entering students. The tests provide a means of assessing acquired knowledge in biology so that the student can be placed in an appropriate introductory course or can receive recognition in terms of placement or credit for a level of mastery equivalent to that normally gained through college courses. Certain subject matter examinations are available for local administration at colleges through Multiple Assessment Programs and Services (MAPS) of the College Board.

This folder provides comparative descriptions of the examinations to assist faculty members, academic administrators, and testing personnel in the selection of the tests that will best meet their requirements. It should also enable high school teachers of biology to guide students to a particular examination on the basis of their preparation and needs, as well as their prospective college's policies. Each college or university determines not only which examinations to accept, but also the level of performance that an individual must demonstrate to obtain credit or placement in a particular course. The pamphlet *Guidelines on the Uses of College Board Test Scores and Related Data** provides specific advice. Also, the College Board, through its regional offices, helps institutions develop policies and practices suited to their needs.

Faculty Involvement

Faculty involvement provides a critical link to the changing practices, curriculums, and standards of American biology education. Policy guidelines concerning the content and format of the three examinations are established by the Advisory Committee on Biology. Development Committees, often assisted by other consultants, write most of the questions that appear in experimental and final forms of the examinations. In addition to reviewing each other's questions by correspondence, committee members meet once or twice a year with test development specialists from Educational Testing Service (ETS) to make final revisions and final selection of questions. An integral part of the committee meetings is the discussion of current content and statistical specifications. Also discussed are possible future changes in light of previous candidate performance, evolving curriculums, and suggestions received from teachers. College and secondary school faculty members actively teaching biology make up both Advisory and Development Committees.

A selected group of college biology teachers and secondary school AP teachers grade the free-response (essay) questions of the AP Examination in a central location. The free-response sections of the AP Examinations written by individual students are available to colleges and schools on request to ETS.

The Examinations

ATP Achievement Test in Biology

Assumed Preparation: Most of the test questions are based on material the Development Committee considers to be a common core taught in the first biology course offered in secondary school. The test provides a measure of achievement in such a course.

For over 10 years, separate analyses have been made for students of each of the 3 versions of the Biological Sciences Curriculum Study (BSCS) and for students of non-BSCS courses. During this period, teachers of BSCS and of non-BSCS courses have been invited to review each question in the examination and indicate its appropriateness for the courses they are teaching. Results suggest that the questions are equally appropriate for all four groups.

Possible Uses: The test is used as part of a selection battery for admission to college, for placement of students in various sections (general, advanced, honors), and for providing information to college biology departments on the knowledge of entering students who plan to major in biology. The justification for using this test to supplement other information in making placement decisions is that, although first-year college biology

*The Order Form provides further information about *Guidelines* and other publications relating to the biology examinations of the College Board.

This folder was prepared and produced for the College Board by Educational Testing Service.

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THE BIOLOGY EXAMINATIONS OF THE COLLEGE BOARD

	Coverage	Format	Administration (When and Where Given)
ATP Achievement Test in Biology	First biology course taught in secondary school	60 minutes: 100 multiple-choice questions	Five times a year at ATP Test Centers
AP Examination in Biology	One-year introductory college course in general biology	90 minutes: 120 multiple-choice questions 90 minutes: required essay section Equal emphasis is given to both sections.	Annually in May in AP Participating Schools
CLEP Subject Examination in General Biology	One-year introductory college course in general biology	90 minutes: 120 multiple-choice questions 90 minutes: optional essay section	Monthly at CLEP Test Centers

courses vary, recent surveys indicate that general biology is the most frequently offered introductory course at the college level. The content of the secondary school course parallels the topics in the college course, and the level of achievement of secondary students covers a wide spectrum. Achievement Test scores are reported on a scale of 200 to 800, and all exams are statistically equated to their previous forms.

AP Examination in Biology

Assumed Preparation: The examination requires thorough preparation in college-level work in general biology. The course description developed by the AP Development Committee, a suggested guide for such work, provides the basis for the examination. The Committee emphasizes that the secondary school course need not cover each topic outlined in the course description and encourages teachers to use creative judgment in selecting, developing, and emphasizing topics within the structure of the course description.

Possible Uses: The examination is designed for placement and credit equivalent to a full first-year introductory college biology course. Advanced Placement grades, based on both the multiple-choice and essay sections, are reported on a five-point scale: 5—extremely well qualified, 4—well qualified, 3—qualified, 2—possibly qualified, 1—no recommendation. Participating colleges normally honor grades of 3 or higher.

CLEP Subject Examination in General Biology

Assumed Preparation: The examination is based on the core elements of introductory college courses in general biology. Various kinds of educational background may be suitable as preparation for the examination. Educational experiences such as extensive and careful reading, correspondence courses, independent study, and work experience comparable to college-level expectations can be the basis for success on the examination. The level of achievement should be equal to that usually gained through the completion of a college or university course in general biology.

Possible Uses: The examination is designed for placement and credit equivalent to a full first-year introductory college biology course. CLEP scores for the Subject Examinations are reported on a scale of 20 to 80.

In addition to the three examinations described above, the College Board offers the CLEP General Examination in Natural Sciences, which tests college-level achievement equivalent to that usually attained in introductory one-year courses surveying both biological and physical sciences. It can be used to satisfy a distribution or general education requirement in the natural sciences. A more detailed description of this examination can be found in the booklet *CLEP General and Subject Examinations.*

Content Specifications

Basically all three examinations are divided into three main content categories: cellular and molecular, organismal, and populational. The emphasis given to different topics within the three major categories is at the discretion of two Development Committees, one of which develops the ATP Achievement Test and the other the AP and CLEP examinations. Brief outlines of the content of the three examinations follow.

ATP Achievement Test in Biology

	Percentage
I. Cellular and molecular biology	20
II. Organismal reproduction, development, growth, and nutrition	15
III. Ecology	15
IV. Heredity and evolution	15
V. Organismal biology (structure and function)	20
VI. Systematics	10
VII. Behavior	5

AP Examination in Biology and CLEP Subject Examination in General Biology

	Percentage
I. Cellular and molecular biology	33
A. Chemical basis of living systems	
B. Cells	
C. Enzymes	
D. Energy transformations	
E. Cell division	
F. Chemical nature of the gene	
G. The origin of life	
II. Organismal biology	33
A. Structure and function in plants with emphasis on angiosperms	
B. Plant reproduction and development	
C. Structure and function in animals with emphasis on vertebrates	
D. Animal reproduction and development	
III. Populational biology	33
A. Heredity	
B. Evolution	
C. Ecology	
D. Behavior	
E. Social biology	

Cognitive Abilities

In addition to the content specifications, the Advisory and Development Committees established specifications for the cognitive abilities to be measured by the ATP, AP, and CLEP examinations in biology as follows:

Level I. Essentially recall: remembers specific facts; demonstrates straightforward knowledge of information and familiarity with terminology

Level II. Essentially application: understands concepts and reformulates information into other equivalent terms; applies knowledge to unfamiliar and/or practical situations; solves mathematical problems

Level III. Essentially interpretation: infers and deduces from data available and integrates information to form conclusions; recognizes unstated assumptions

Differences among the Examinations

All three examinations cover similar topics. Comparable questions may appear on a test for students with only the introductory secondary school course preparation in biology and on a test for students taking a college-level course or its equivalent. Differences emerge in the level of complexity, the emphases of specific areas, and the approach to each examination. The Achievement Test covers material usually taught at the tenth-grade level. The examination takes into account the wide range of students who typically take secondary school biology courses and the fact that, for most students, a two-year lapse generally precedes the taking of a subsequent course in college biology. As a consequence, the content of the examination is geared to cover a broad spectrum of topics and more than one-half of the examination emphasizes cognitive abilities other than recall.

The AP Examination in Biology and the CLEP Subject Examination in General Biology measure knowledge of facts, principles, and processes of biology; understanding of how information is collected, applied, and interpreted as well as how hypotheses are formulated from available data and further predictions made; and understanding that science is a human endeavor with social consequences.

Both the AP and CLEP examinations measure achievement equivalent to a first-year college course. The multiple-choice sections of the AP and CLEP examinations cover similar content areas. The AP Examination has a required essay section that calls for written analyses and discussion of biological problems in each of the three major content areas. The CLEP examination has an essay section that is optional and graded by the receiving college. Its coverage is similar to that of the essay section of the AP Examination.

Comparison of AP Candidates with Students Finishing a First-Year Biology Course in College

During the spring of 1977, a study was made comparing AP candidates with students finishing a first-year biology course in college. The undergraduates included in the study were selected from 31 institutions receiving large numbers of AP candidates and/or large numbers of CLEP candidates. The multiple-choice section of the 1977 AP Examination in Biology was administered to 2,207 undergraduate students. The AP candidates who took the 1977 AP Examination in Biology scored higher on the multiple-choice section than the group of students who were in the college norming sample. In terms of reported scores, an average AP candidate performed at a level that would have yielded an average scaled score of 60 on the CLEP 20-to-80 scale compared to a mean scaled score of 50 for the college norming sample. The mean CLEP scaled score earned by those college students who received a final course grade of A was 55; the mean score for students receiving a college grade of B was 50, and the mean score for

students who received a college grade of C was 46. The data, however, are to be read with caution as achievement may differ because many colleges do not give a final comprehensive examination covering the entire academic year, which is essentially what is asked of the AP student.

Comparative Test Data

The table below provides the measurement characteristics (score scale, mean, standard deviation, standard error of measurement, reliability, and percent completing 75 percent of test) of the 3 examinations.

COMPARATIVE TEST DATA

	Score Scale	Mean	Standard Deviation	Standard Error of Measurement	Reliability	% Completing 75% of Test
ATP Achievement Test in Biology	200–800	516	106	32	.91	99.3
AP Examination in Biology						
Multiple-choice (50% of score)	—	—	—	—	.93	99.9
Essay (50% of score)	—	—	—	—	.65–.80	
Composite	1–5	3.3	1.1	8.6[a]–6.9[a]	.88–.92	
CLEP Subject Examination in General Biology	20–80	50[b]	10[b]	2.7	.93	99.7

Note: The score on all multiple-choice sections of these tests is corrected for guessing by subtracting from the number of correct questions one-fourth of the number of questions marked wrong.

[a]Based on the composite raw scores for an edition of a test with a maximum composite score of 150

[b]Based on a 1977 norming sample of 2,207 college students who had completed a one-year course in biology

Glossary

Mean: The average

Reliability: The consistency of the grade or score that candidates would receive if they were to repeat the examination (usually expressed as a correlation coefficient)

Scaled Score: A score to which a raw score is converted for reasons of convenience, comparability, and ease of interpretation

Standard Deviation: A measure of the spread (extent of variability) of a set of scores around their mean. The less the spread, the smaller the standard deviation

Standard Error of Measurement: An indication of the extent of the error inherent in an obtained score because of the imperfect reliability of a test. It indicates (in score units of the test) the range of discrepancy between the true score and the obtained score.

True Score: The score a student would earn if a test could measure ability perfectly

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Note: Requests for information about the use of a program should be directed to your College Board Regional Office. Specific questions about any of the biology examinations may be addressed to the ETS consultants listed above, Educational Testing Service, Princeton, New Jersey 08541.

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